FLOOD INSURANCE STUDY

PULASKI COUNTY, KENTUCKY
UNINCORPORATED AREAS

JULY 16, 1980

Federal Emergency Management Agency

COMMUNITY NUMBER 210197

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY

PULASKI COUNTY,
UNINCORPORATED AREAS,
KENTUCKY

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Unincorporated Areas of Pulaski County, Kentucky, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by GRW Engineers, Inc. (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Contract No. EMW-86-R-2245. This study was completed in October 1987.

1.3 Coordination

On January 28, 1986, an initial consultation meeting was held with representatives of FEMA, Pulaski County, and the Study Contractor. Coordination with town officials and Federal, state, and regional agencies produced a variety of information pertaining to floodplain regulations, available community maps, flood history, and other hydrologic data.

On August 22, 1989, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Pulaski County, Kentucky. The area of study is shown on the Vicinity Map (Figure 1). The incorporated areas within the County were excluded from this study.

Flooding caused by overflow of Pitman Creek, Caney Fork, Pointer Creek, and Lake Cumberland was studied in detail.

Areas having low development potential or minimal flood hazards were previously studied using approximate analyses. The results were shown on the Flood Hazard Boundary Map for Pulaski County, Kentucky (Reference 1) and are incorporated into this Flood Insurance Study.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through October 1992. The scope and methods of study were proposed to and agreed upon by FEMA and Pulaski County.

2.2 Community Description

Pulaski County is in southern Kentucky. Its county seat, the City of Somerset, is situated approximately 76 miles south of the City of Lexington. Pulaski County is bordered by Rockcastle and Laurel Counties on the east, McCreary and Wayne Counties on the south, Russell and Casey Counties on the west, and Lincoln County on the north. The County has an area of approximately 660 square miles. The 1982 population was reported to be 46,200 (Reference 2). The County is served by State Routes 39, 70, 80, 90, 192, 196, 452, 461, 769, 837, and 1247; and U.S. Route 27.

Pitman Creek, a tributary of the Cumberland River, flows southward through the county over a distance of over 12 miles. One of its tributaries is Caney Fork which flows eastward through the study area north of the City of Somerset and includes a reservoir of about 0.25 mile in length. The outlet structure of this reservoir is a concrete drop spillway which is located approximately 0.13 mile upstream of the confluence of Caney Fork and Pitman Creek.

Pointer Creek is a tributary of Fishing Creek, which is in turn a tributary of the Cumberland River. Pointer Creek flows eastward through the western portion of the county for a distance of almost 5 miles.

There is very little development within the floodplain limits of any of these three streams, and that which does exist consists of scattered residential and agricultural development.

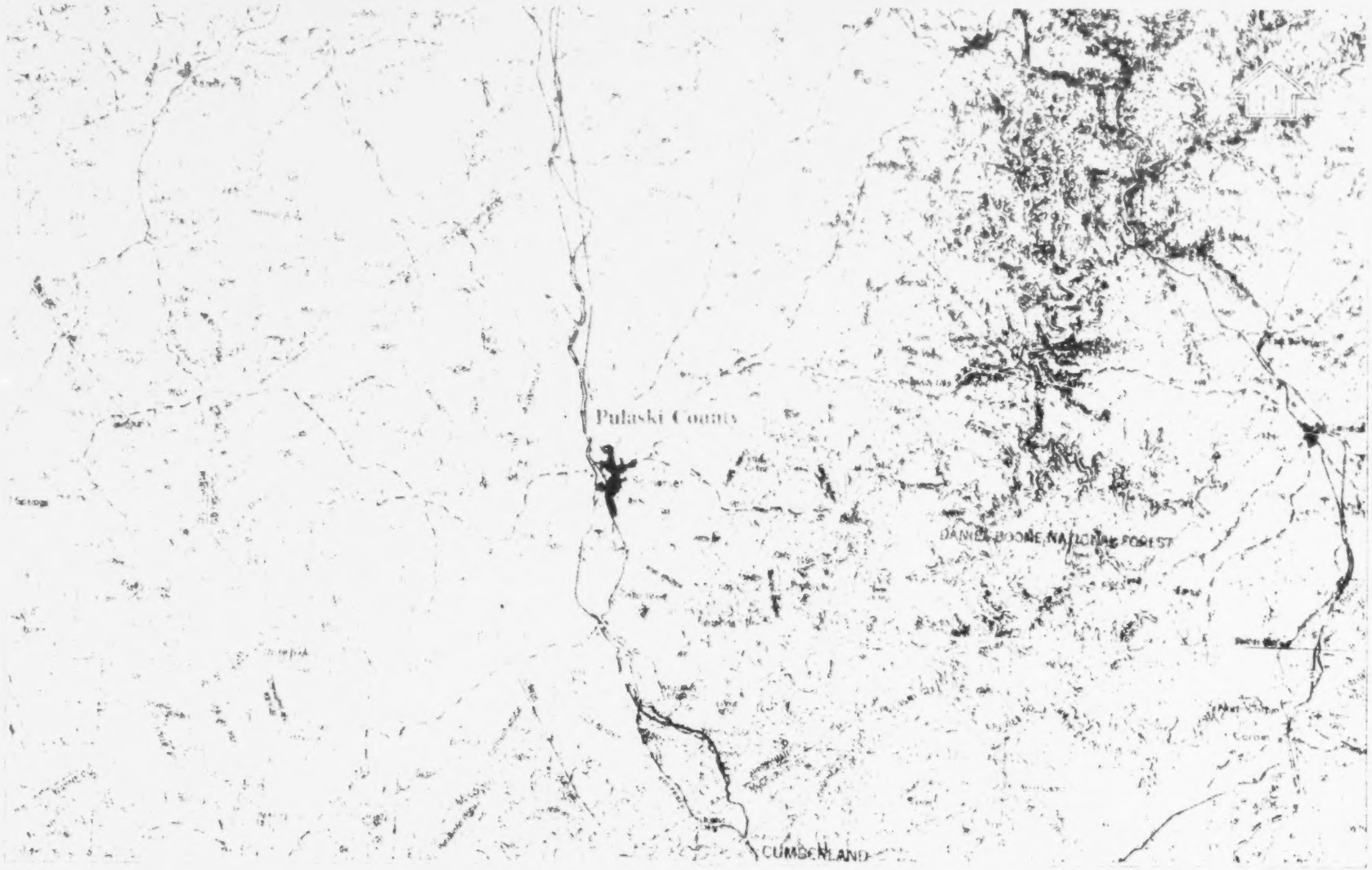

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

PULASKI COUNTY, KY
(UNINCORPORATED AREAS)

APPROXIMATE SCALE

4 0 4 8 MILES

VICINITY MAP

The climate in Pulaski County is temperate, with winters that are moderately cold and summers that are warm and humid. Precipitation averages about 49 inches annually, and although it is fairly well distributed throughout the year, the rainfall tends to be lightest in October and heaviest in January, February, and March (Reference 3).

2.3 Principal Flood Problems

The U.S. Geological Survey (USGS) operated a gaging station on Pitman Creek from 1954 until 1981, a short distance downstream from an old bridge which serves several isolated residences. The gage covered a drainage area of 31.3 square miles. The highest crest recorded at this gage was 877.29 feet on February 27, 1962. Based upon a USGS flood frequency analysis (Reference 4), this event can be assigned a recurrence interval of about 25 years. However, the analysis is of limited value due to the relatively short lifespan of the gaging station.

During field reconnaissance, several of the nearby residents related recent experiences in which high water levels nearly reached the elevations of their homes.

2.4 Flood Protection Measures

Although a small reservoir and dam is located on Caney Fork, it does not provide significant protection against the 100-year flood.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40-percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60-percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

The discharges for each of the three streams were determined by USGS methods designed for ungaged streams (Reference 4). These methods enabled the determination of the 10-, 50-, and 100-year discharges of each stream, and from these three values a 500-year discharge was calculated through a regression analysis of the discharge versus log-of-return-interval relationship.

Peak discharge-drainage area relationships for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
PITMAN CREEK					
1.35 miles upstream of State Route 80	34.40	3,630	5,320	6,060	7,750
at Mill Road	29.67	3,290	4,820	5,500	7,040
at State Route 39	24.81	2,910	4,280	4,890	6,270
at State Route 635	15.02	2,070	3,070	3,510	4,510
CANEY FORK					
at mouth	4.52	920	1,380	1,590	2,050
POINTER CREEK					
at mouth	16.06	3,830	5,780	6,650	8,610
at confluence of Little Pointer Creek	8.36	2,460	3,750	4,330	5,630

Elevations for the 100-year flood of Lake Cumberland portion of the Cumberland River and South Fork Cumberland River are shown in Table 2. This elevation was provided by the Nashville District COE.

TABLE 2 - SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	PEAK ELEVATION (FEET NGVD) 100-YEAR
LAKE CUMBERLAND within community	749.8

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections, bridge sections, and culvert sections were all obtained from field surveys.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

Roughness coefficients (Manning's "n") used in hydraulic computations were chosen by engineering judgment and based on field observations of the streams and floodplain area. Roughness values for the channel of each stream ranged from 0.05 to 0.07; floodplain roughness values ranged from 0.075 to 0.10 for all floods (Reference 5)

Water-surface elevations of floods of the selected recurrence intervals were computed using HEC-2 step-backwater computer program (Reference 6).

The starting water-surface elevations (for Pitman Creek and Pointer Creek) were calculated using the slope-area method (Reference 7). Since Caney Fork flows through a reservoir, the tributary was divided into an upstream and downstream portion for the purpose of HEC-2 modeling. For the upstream portion, the starting water-surface elevations were obtained from a reservoir stage-discharge curve which was provided by the Kentucky Division of Water. The starting water surface elevations of the downstream portion were obtained from the water-surface elevations determined for Pitman Creek at the confluence point.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 50- and 100-year flood elevations are close together, due to limitations of the profile scale, only the 100-year profile has been shown.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 with contour intervals of 10 and 20 feet (Reference 8).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, A11, AO, A99, V, and V11) and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map.

4.2 Floodways

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights.

Floodways have not been shown or computed for this community. Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than a 1.0-foot increase in the base flood elevations at any point within the community.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

Flood Insurance Rate Maps printed for the City of Somerset, and Wayne and Lincoln Counties, Kentucky (References 9-11) are in agreement with this study.

Flood Insurance Studies in progress for the City of Burnside, and Russell County, Kentucky (References 12-13) are in agreement with this study.

This Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for Pulaski County, Kentucky (Reference 1).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 1371 Peachtree Street, NE., Suite 736, Atlanta, Georgia 30309.

Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the map repository of flood hazard data located in the community.

9.0 REFERENCES AND BIBLIOGRAPHY

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2. Kentucky Department of Economic Development, Commonwealth of Kentucky, Kentucky Economic Statistics, 1986.

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4. U.S. Geological Survey, Water Resources Investigations 76-62, Technique for Estimating Magnitude and Frequency of Floods in Kentucky, C.H. Hannum, 1976.

5. ————, Roughness Characteristics of Natural Channels, 1967.

6. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, April 1984.

7. Chow, Ven T., Open-Channel Hydraulics, McGraw-Hill Book Company, 1959.

8. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Intervals 10 Feet and 20 Feet: Bobtown, Kentucky, 1954; Mintonville, Kentucky, 1953; Science Hill, Kentucky, 1961; Somerset, Kentucky, 1973.

9. Federal Emergency Management Agency, Flood Insurance Rate Map, City of Somerset, Pulaski County, Kentucky, September 1985.

10. ————, Flood Insurance Rate Map, Wayne County, Unincorporated Areas, Kentucky, September 1985.

11. ————, Flood Insurance Rate Map, Lincoln County, Unincorporated Areas, Kentucky, July 1986.

12. ----------, Flood Insurance Study, City of Burnside, Pulaski County, Kentucky, in progress.

13. ————, Flood Insurance Study, Russell County, Unincorporated Areas, Kentucky, in progress.

ELEVATION REFERENCE MARKS

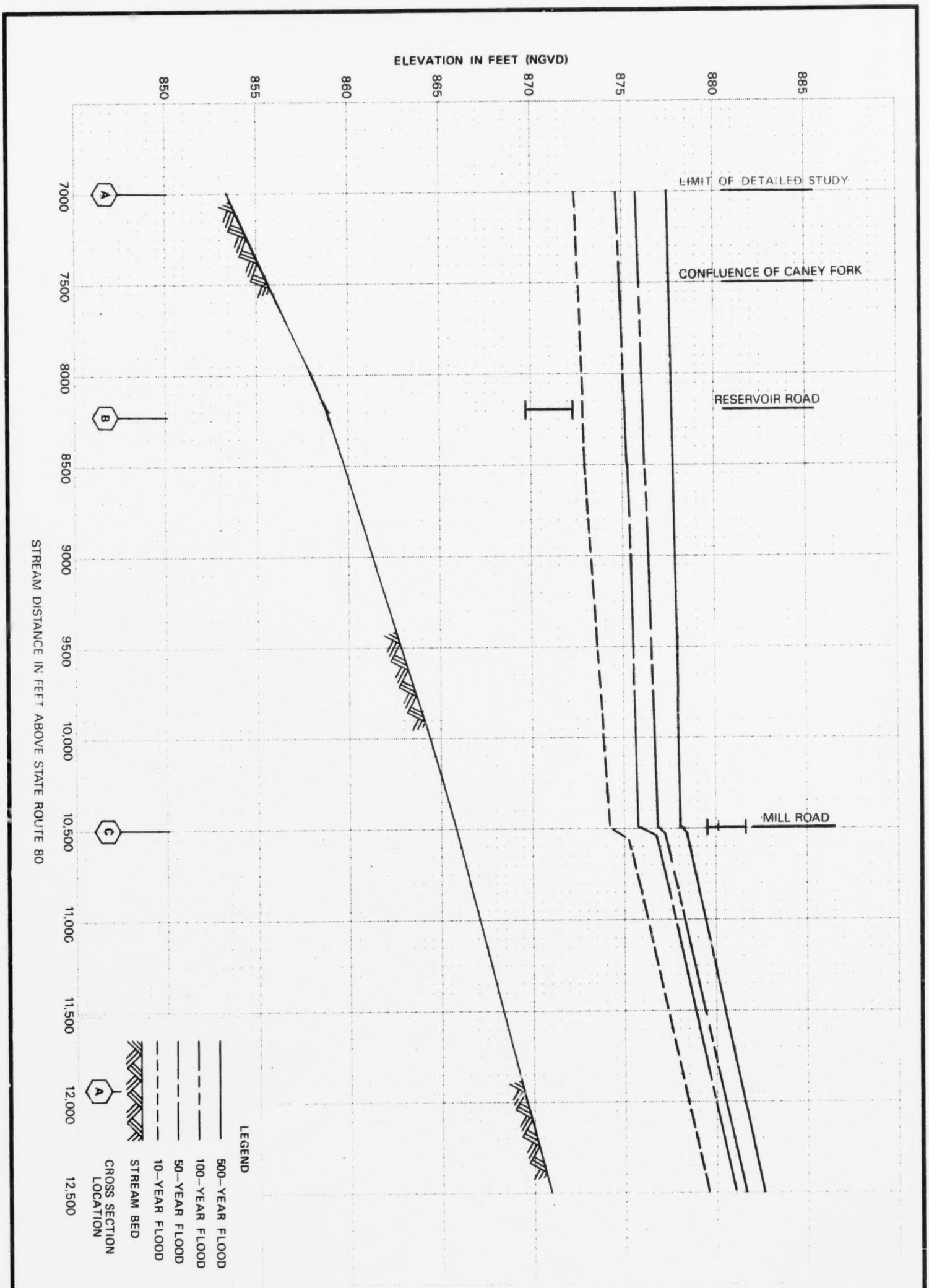
REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0075	860.65	railroad spike in base of 12-inch sycamore tree just east of Carter Ridge-Hickory Nut Ridge Road, on west bank of small tributary of Pointer Creek
2	0075	846.24	railroad spike in base of 12-inch walnut tree on north bank Pointer Creek, about 0.4 mile east of confluence with Pittman Branch
3	0075	873.88	railroad spike in base of 6-inch sycamore tree at edge of cornfield on south bank of Pointer Creek, about 0.5 mile west of confluence with Pittman Branch
4	0075	911.64	railroad spike in base of 18-inch walnut tree on north bank of Pointer Creek, about 1.4 miles west of confluence with Pittman Branch, approximately 300 feet southeast of barn
5	0100	803.80	railroad spike in 24-inch poplar tree on north bank of Pointer Creek, 800 feet south of Pointer Creek Road, about 0.3 mile east of confluence of Pointer Creek and Little Pointer Creek
6	0100	789.06	railroad spike in 18-inch maple tree at edge of Pointer Creek Road, on north bank of Pointer Creek, 100 feet east of gas well
7	0100	773.80	railroad spike in 14-inch walnut tree 700 feet southwest of Pointer Creek-Oil Center Road, on north bank of Pointer Creek, about 800 feet southeast of confluence with Murray Hollow
8	0100	764.10	railroad spike in 16-inch maple tree on north bank of Pointer Creek about 100 feet east of Unnamed Road

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
9	0100	1,045.838	U.S. Coastal and Geodetic Survey bronze disk set in concrete, located along Clines Road, about 1.1 miles south of intersection of Clines Road and State Route 1676
10	0125	872.19	railroad spike in 24-inch walnut tree, roughly 500 feet south of 90 degree bend in Reservoir Road, about 400 feet southwest of confluence of Pitman Creek and Caney Fork
11	0125	877.21	railroad spike in 14-inch oak tree, on south bank of Pitman Creek, about 1,000 feet south of Reservoir Road bridge over Pitman Creek
12	0125	872.47	chiseled square on northwest corner of Reservoir Road bridge over Pitman Creek
13	0125	888.19	bronze disc set in concrete gaging station located just south of Mill Road bridge over Pitman Creek
14	0125	900.25	top of right-of-way marker at 2-mile marker on State Route 39, about 400 feet west of centerline of Pitman Creek and about 0.5 mile northeast of intersection of State Route 39 and Mill Road
15	0125	903.63	chiseled square on southeast corner of State Route 39 bridge over Pitman Creek
16	0125	906.68	railroad spike in base of 36-inch double sycamore, about 300 feet southeast of dirt road
17	0125	919.87	railroad spike 3 feet above ground in 48-inch sycamore in fence line on west bank of Pitman Creek, about 1.7 miles north along stream from State Route 39

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
18	0125	922.94	railroad spike in base of 18-inch hickory on west bank of Pitman Creek, about 1.9 miles north along stream from State Route 39
19	0125	951.32	chiseled square on southwest wingwall of State Route 635 bridge over Pitman Creek
20	0125	891.45	railroad spike in base of 20-inch white oak tree, located 0.25 miles east of State Route 39 along Reservoir Road, on south side of road



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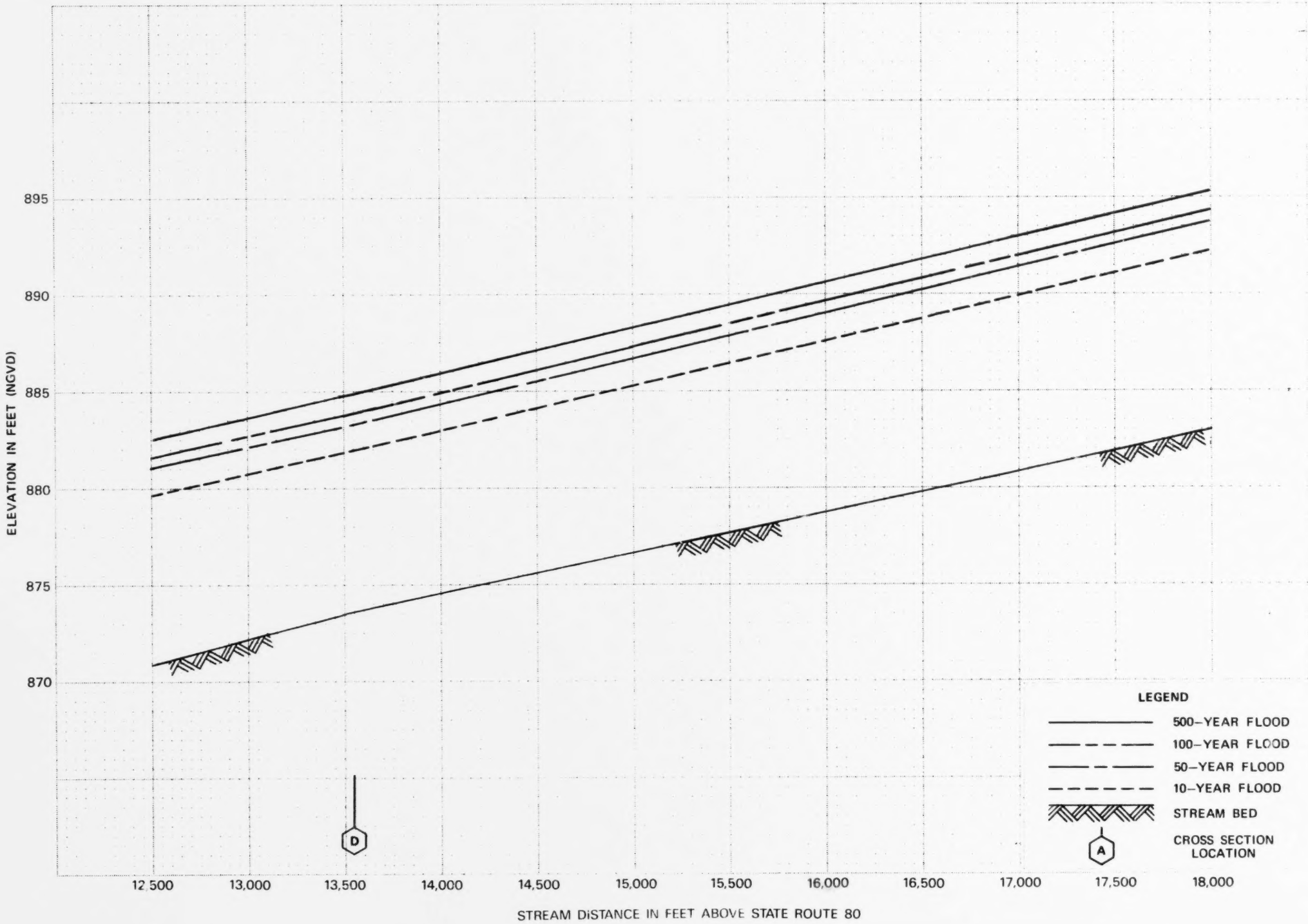


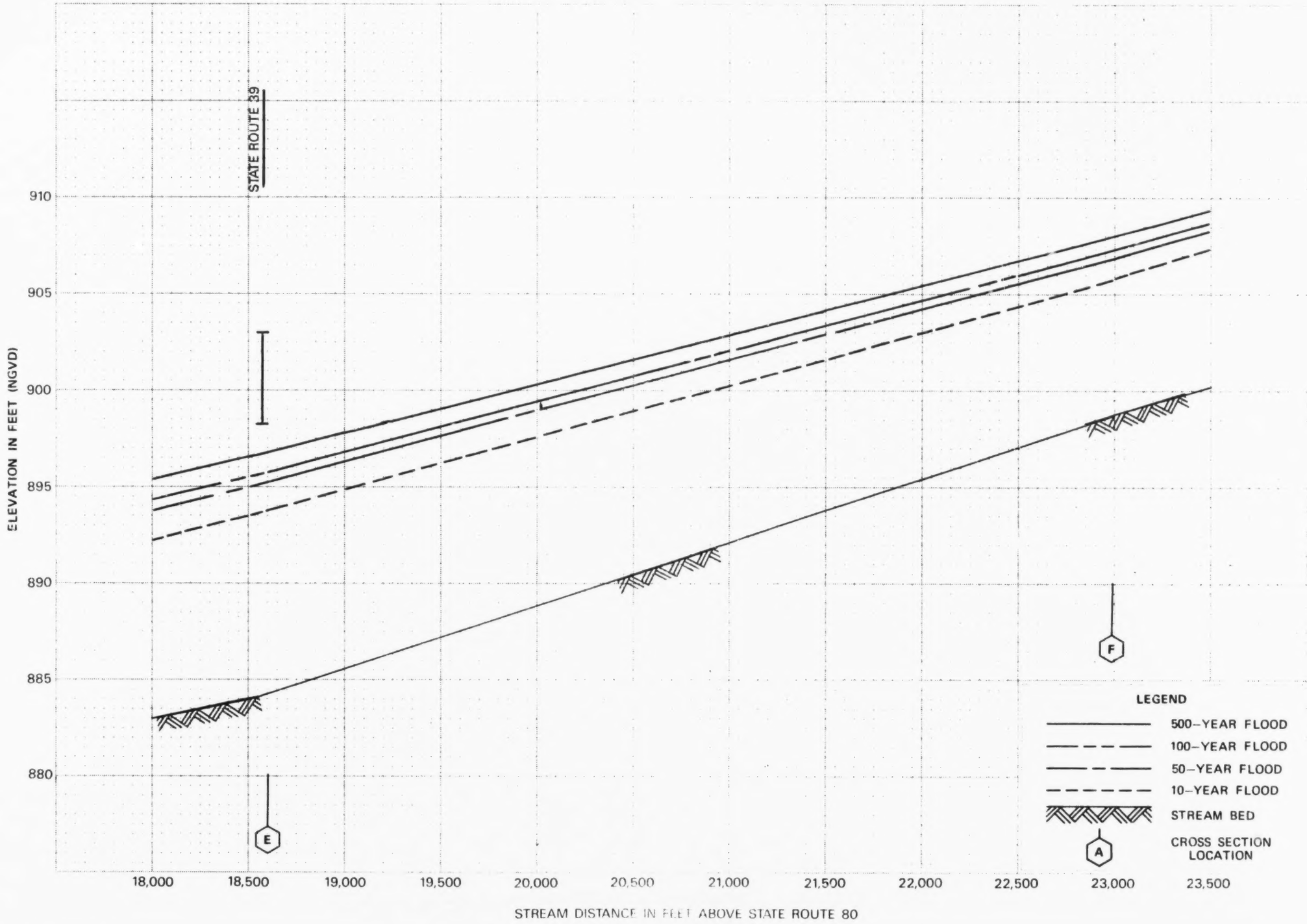
FLOOD PROFILES

PITMAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PULASKI COUNTY, KY
(UNINCORPORATED AREAS)

02P



FLOOD PROFILES

PITMAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PULASKI COUNTY, KY
(UNINCORPORATED AREAS)

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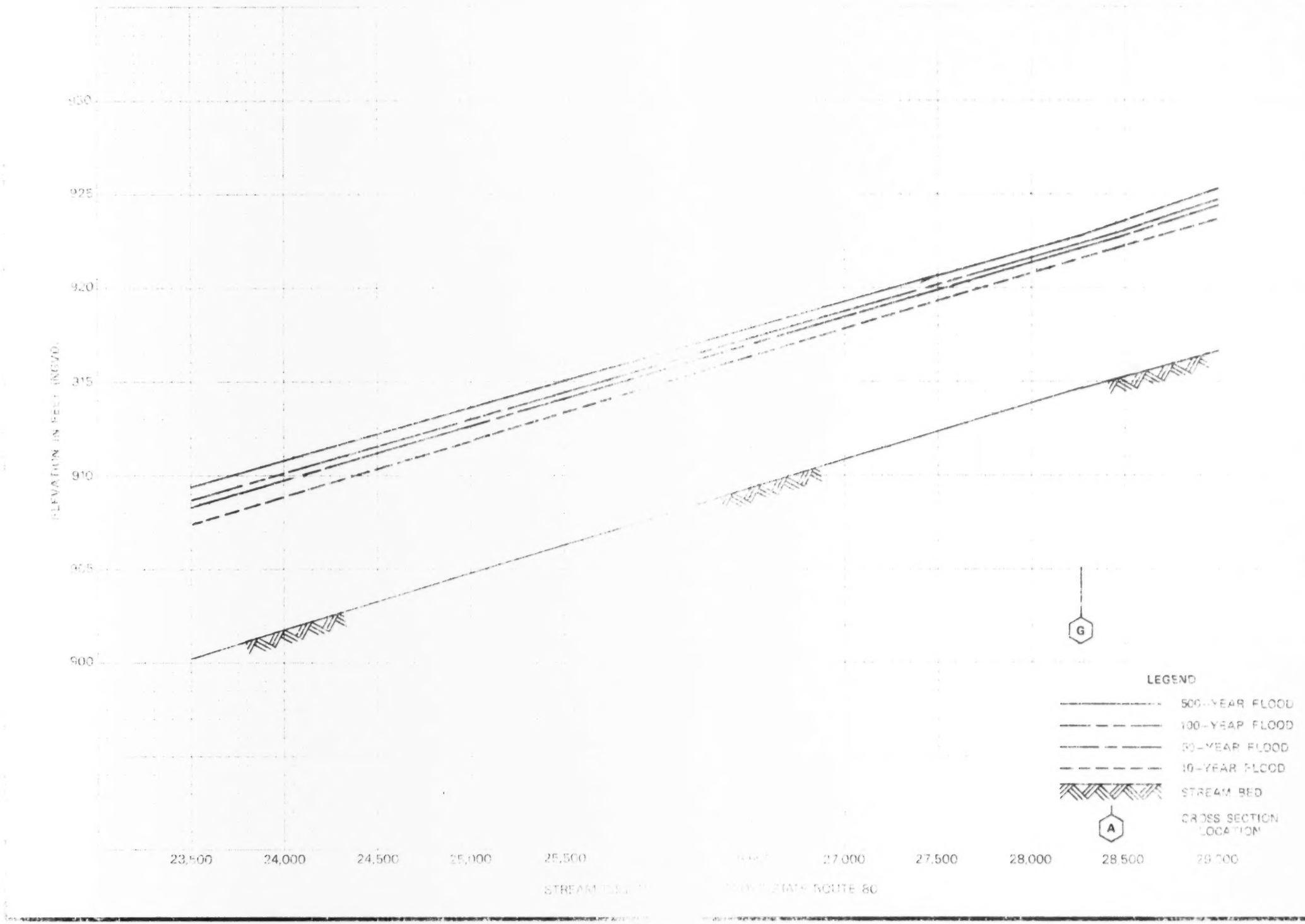
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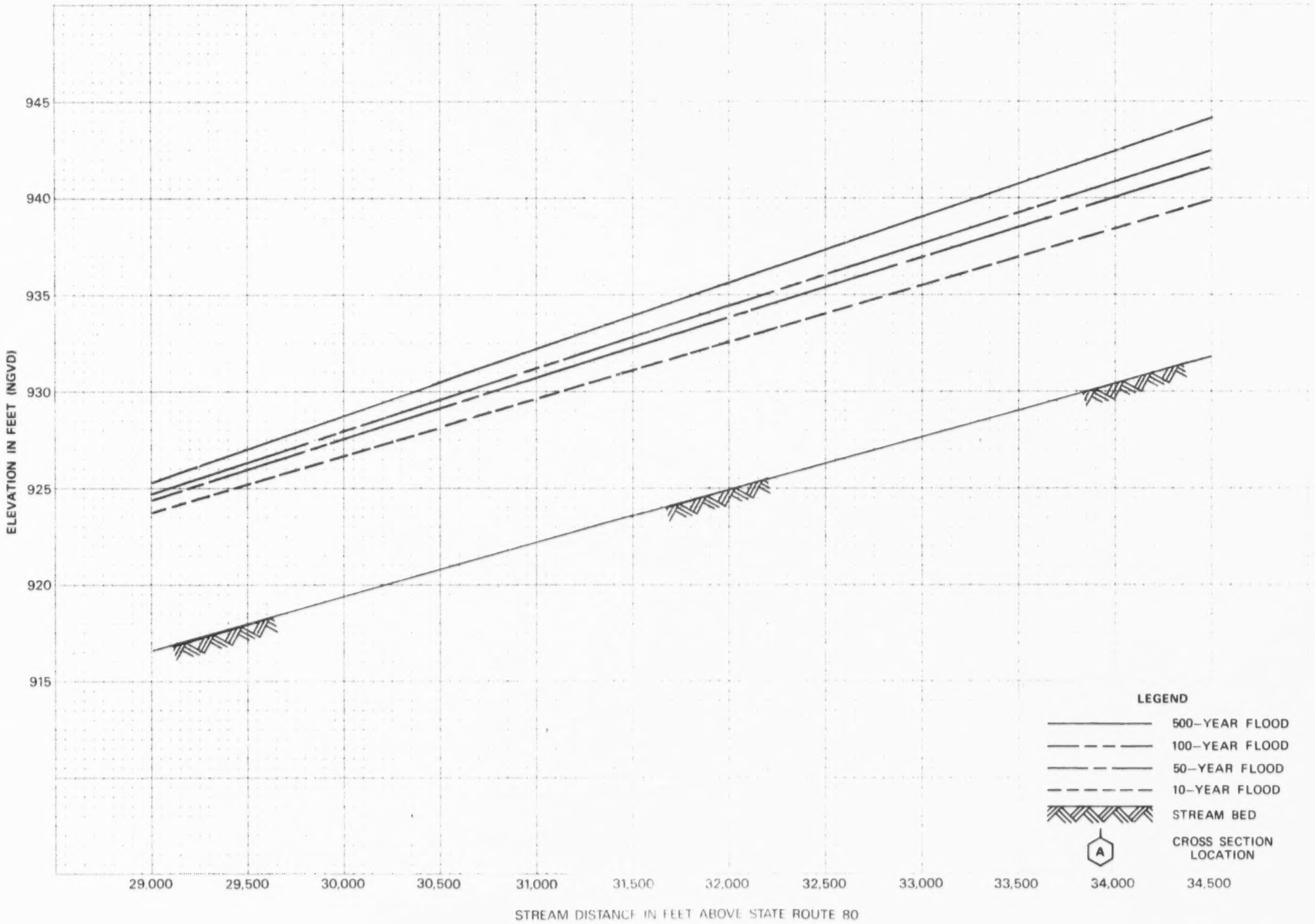

FLOOD PROFILES

PITMAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PULASKI COUNTY, KY
(UNINCORPORATED AREAS)

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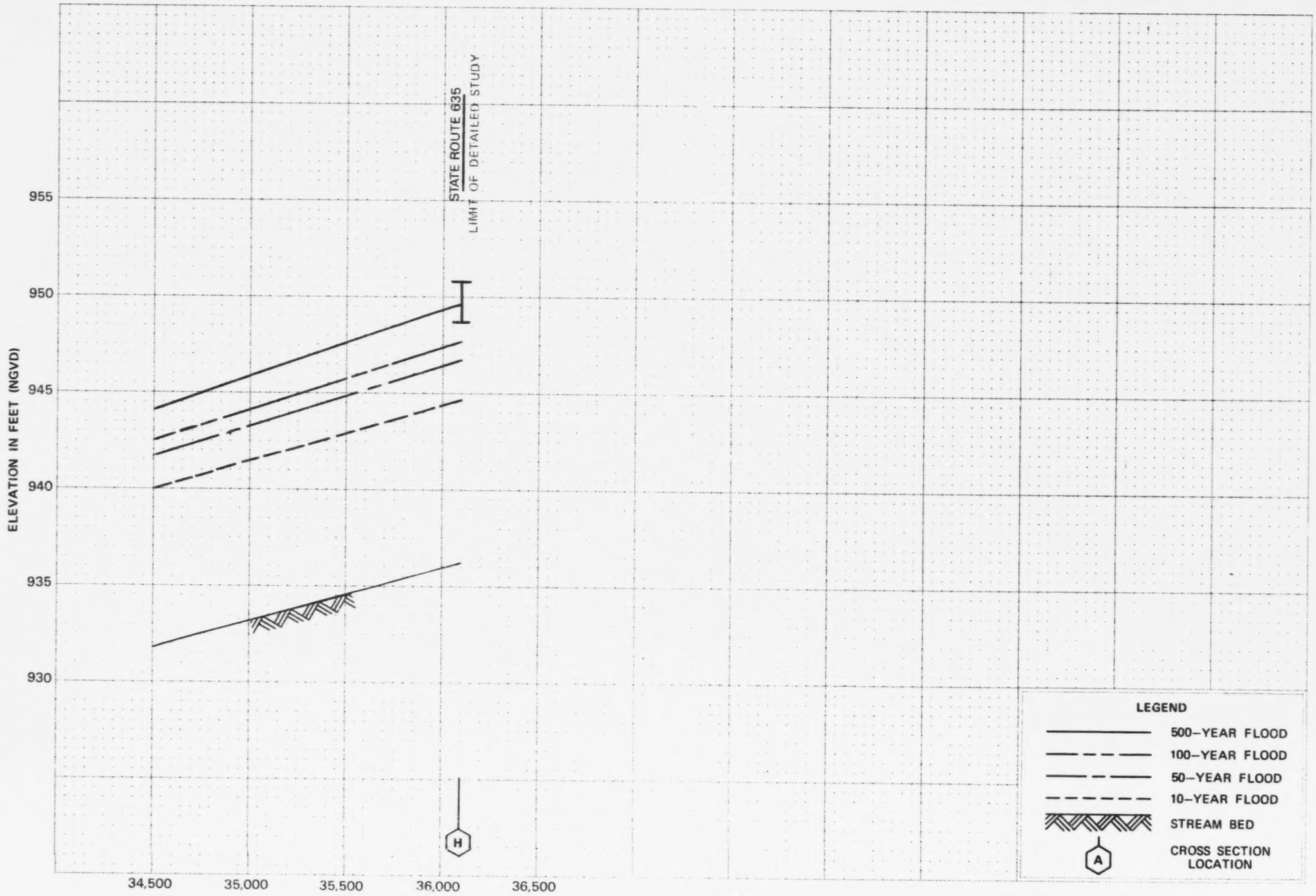

FLOOD PROFILES

PITMAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PULASKI COUNTY, KY
(UNINCORPORATED AREAS)

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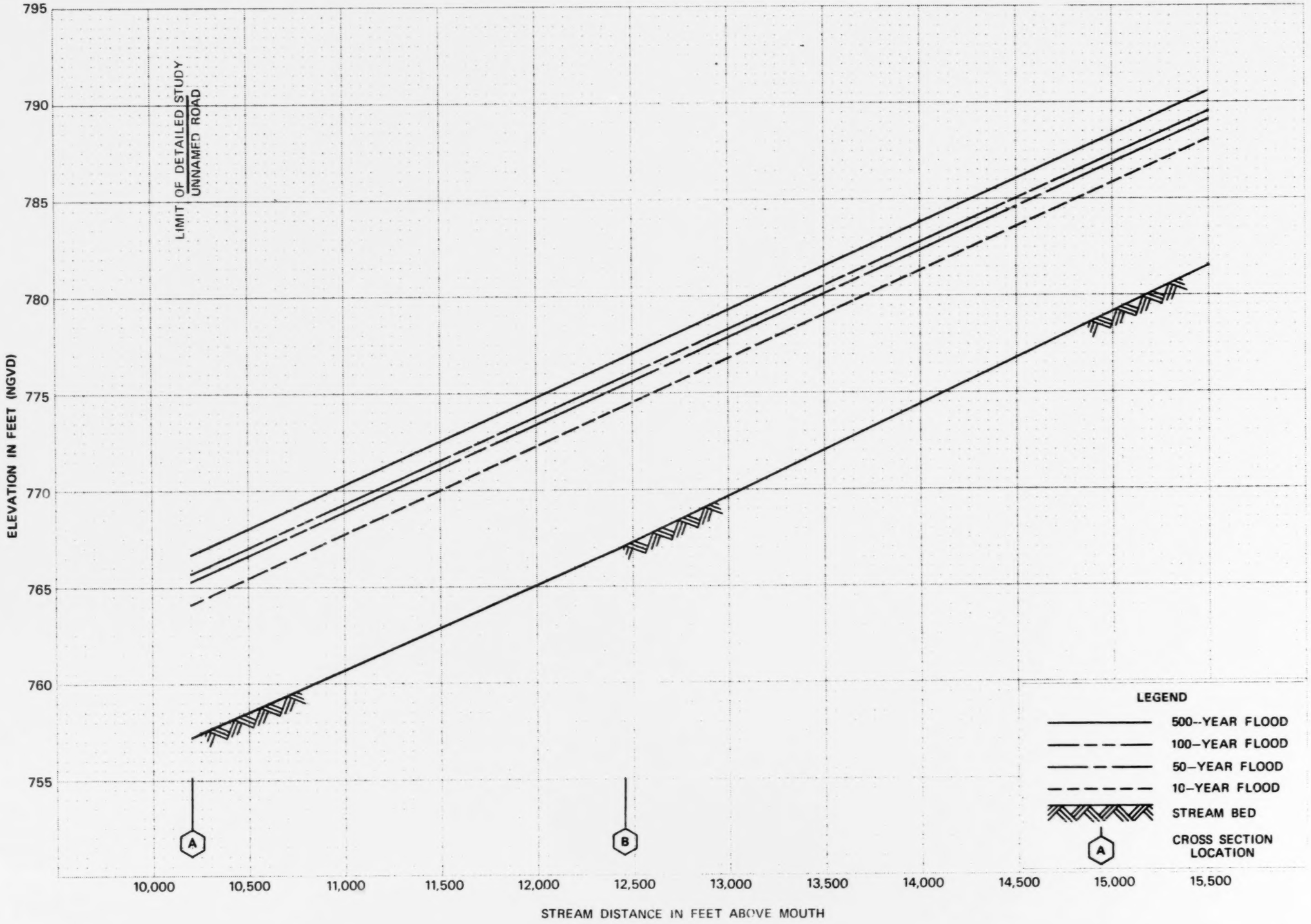

FLOOD PROFILES

POINTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PULASKI COUNTY, KY
(UNINCORPORATED AREAS)

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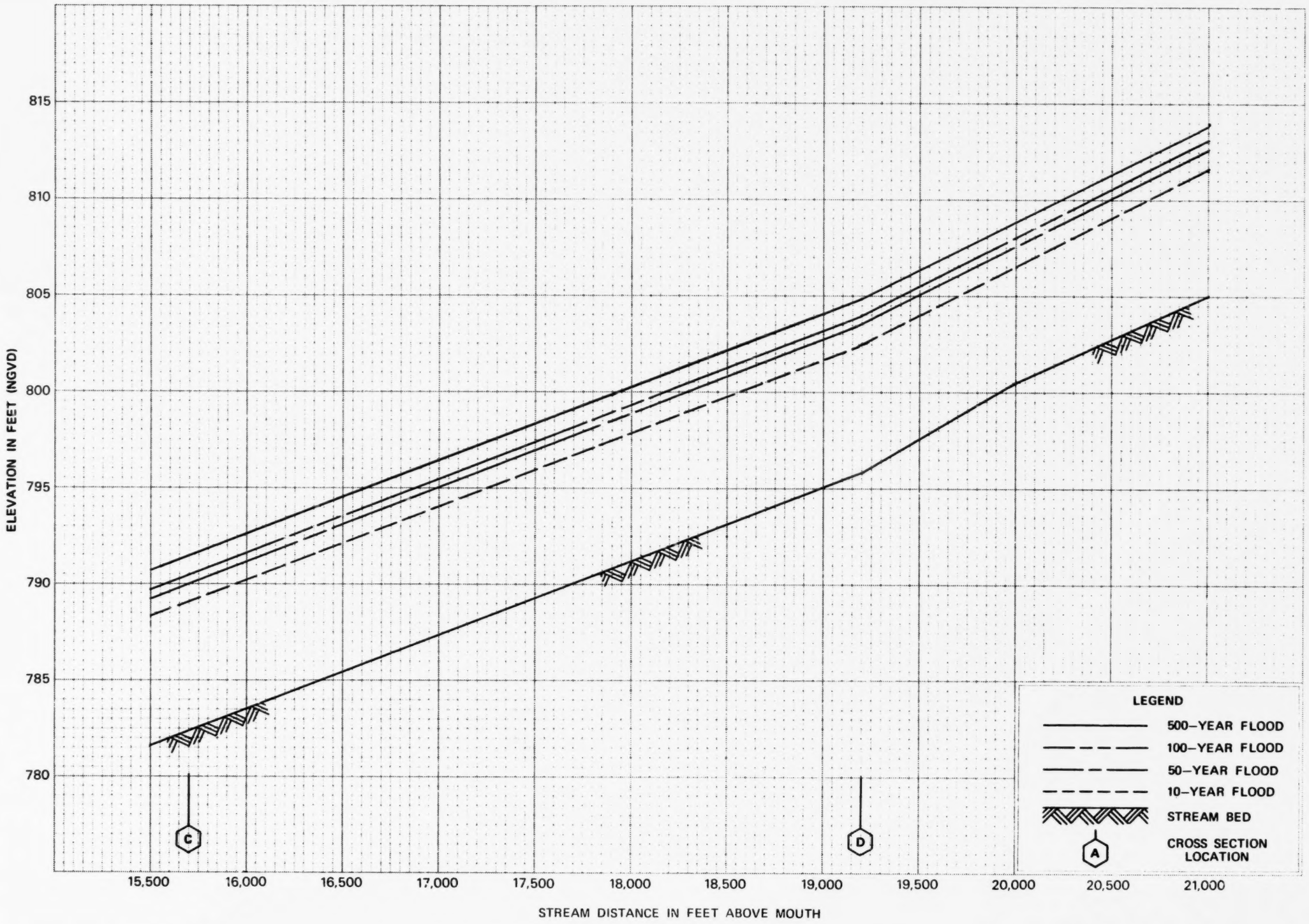


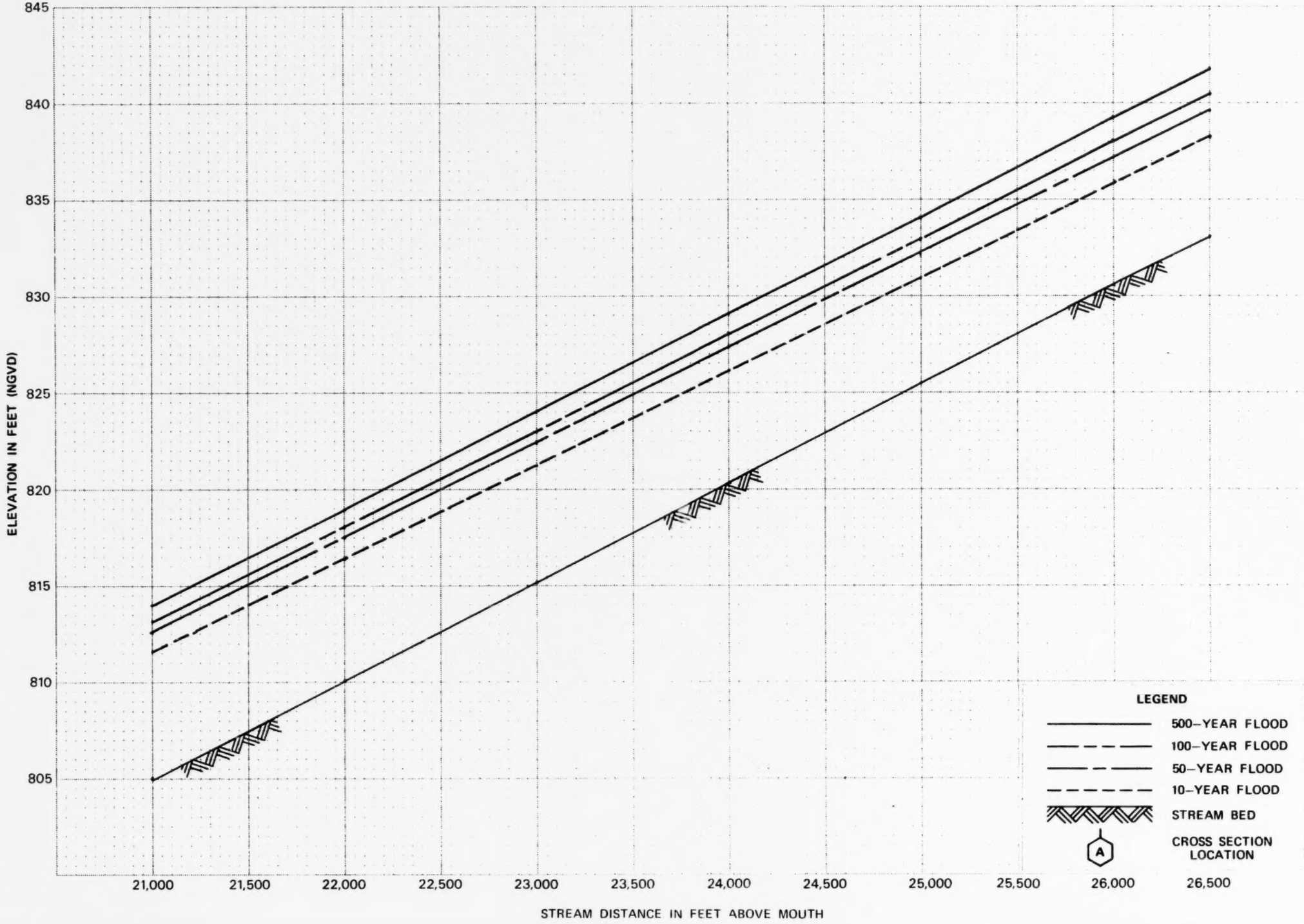
FLOOD PROFILES

POINTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PULASKI COUNTY, KY
(UNINCORPORATED AREAS)

08P



FLOOD PROFILES

POINTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PULASKI COUNTY, KY
(UNINCORPORATED AREAS)

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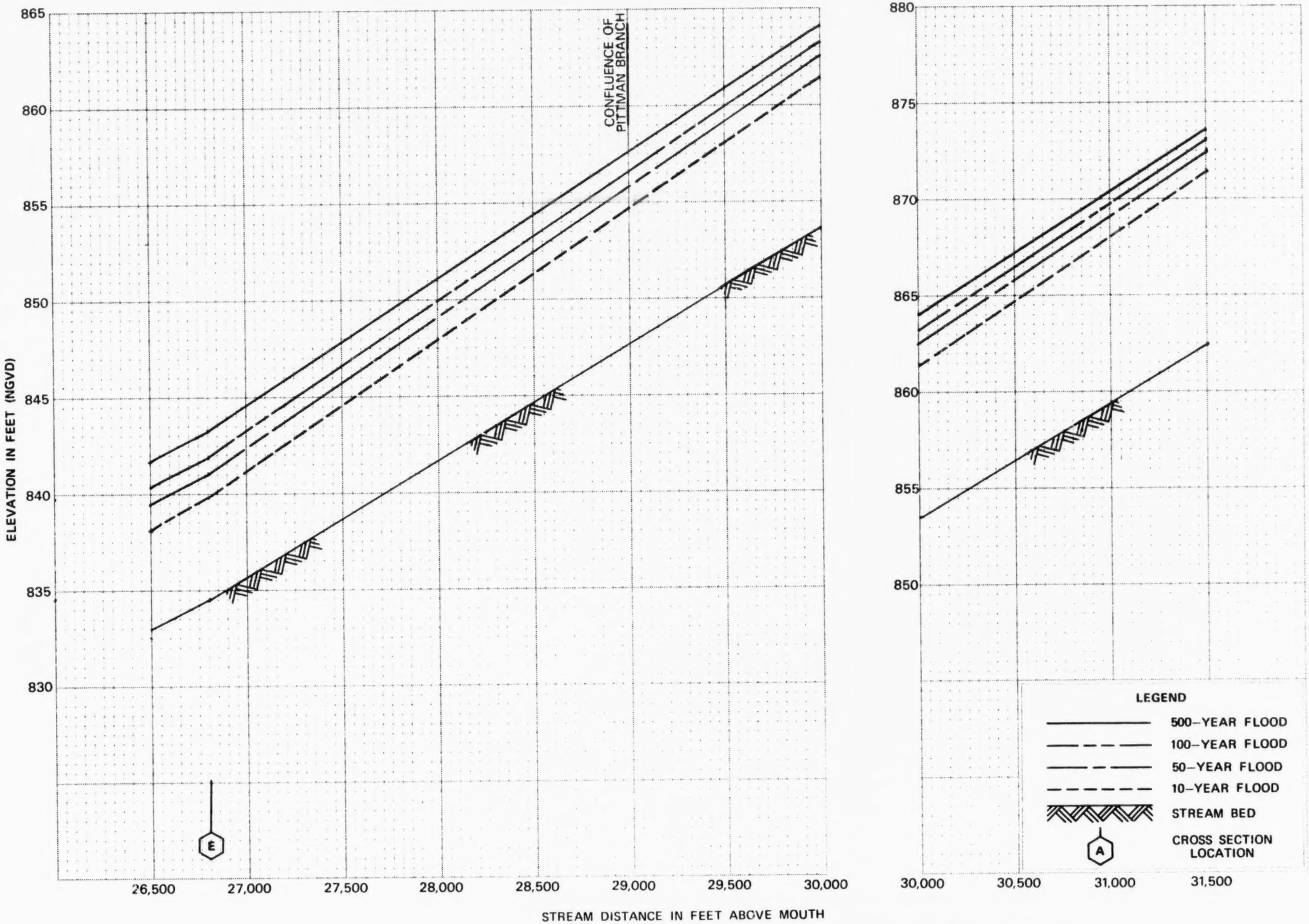

FLOOD PROFILES

POINTER CREEK

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PULASKI COUNTY, KY
(UNINCORPORATED AREAS)

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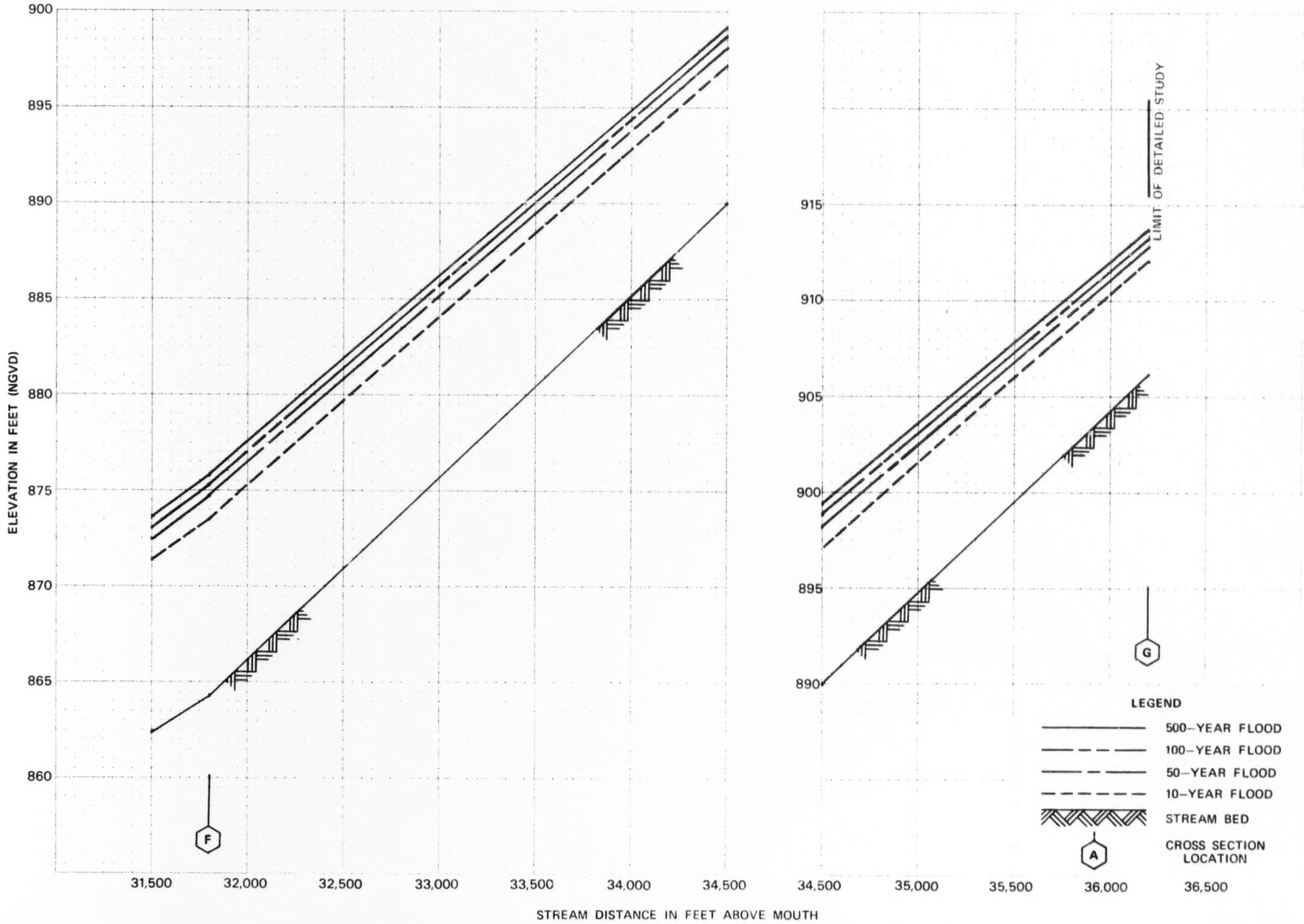


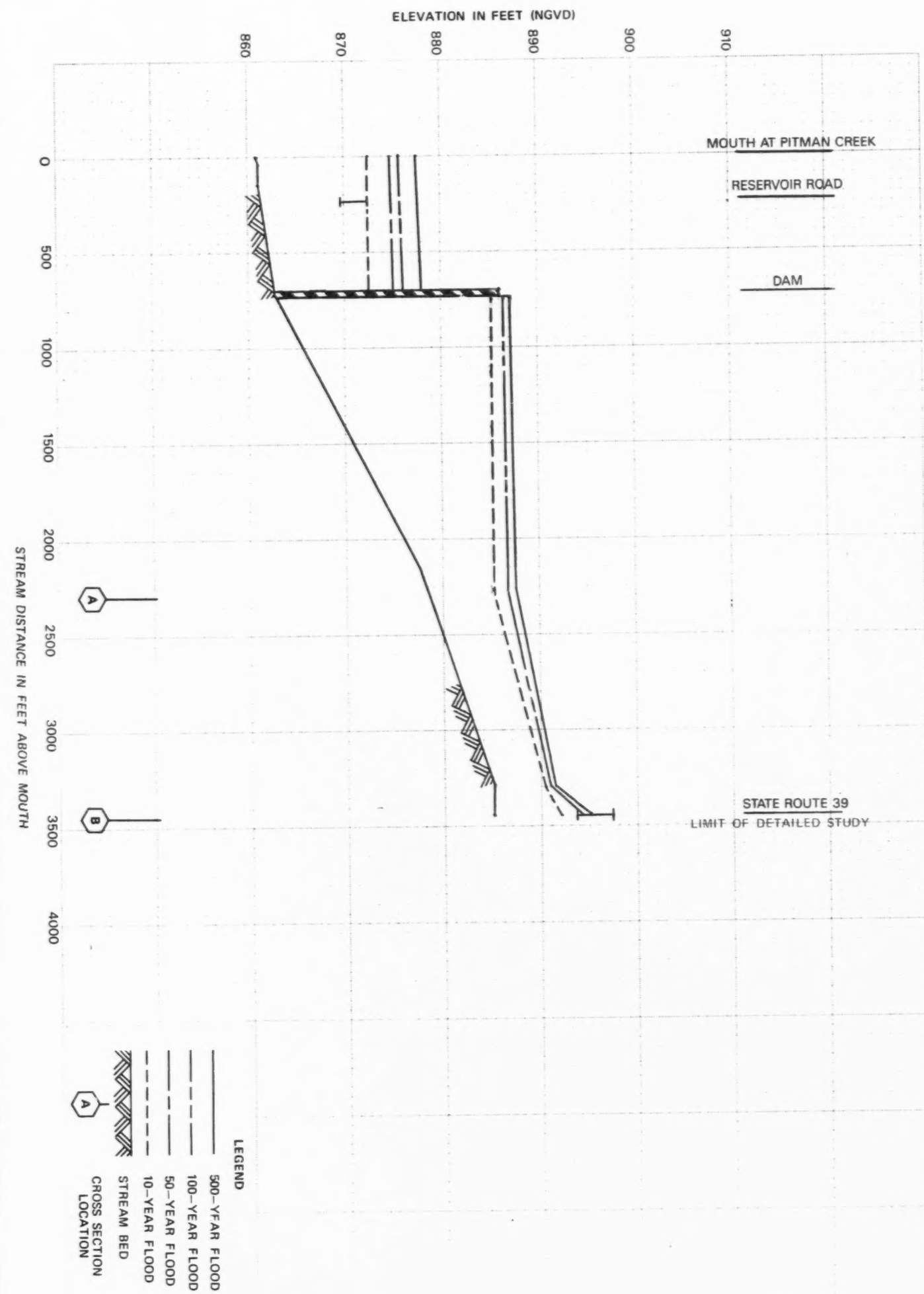
FLOOD PROFILES

POINTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PULASKI COUNTY, KY
(UNINCORPORATED AREAS)

11P



12P	FEDERAL EMERGENCY MANAGEMENT AGENCY **PULASKI COUNTY, KY** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **CANEY FORK**